MEMORANDUM CH2MHILL®

Repair of Panel N39 and Placement of Geotextile and Armor Stone in Panels N37, N38, and N39

PREPARED FOR: demaximis, inc.

COPY TO: Gary Foster, CH2M HILL

PREPARED BY: George Hicks, CH2M HILL

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During placement of geotextile panel N39 on the northern end of the cap area (Figure 1), the geotextile panel and armor stone placed on top of the geotextile slid down the slope. Subsequently, the geotextile/armor stone which accumulated at the bottom of the slope was removed on March 31, 2014. The following sections outline the proposed means and methods to repair the N39 area and place geotextile and armor stone in uncompleted panels N39, N38, and N37.

Repair of Panel N39

The active cap layer (Sand/AquaGate) in the panel N39 area will be repaired by placing Sand/AquaGate cap material (as necessary) to meet the thickness requirements within the N39 area. A bathymetric survey of panel N39 showed an area at station 31+60 (center of panel N39) where some of the cap material was scoured during the failure. Cap materials (Sand/AquaGate) will be added to these low areas using the material handler, equipped with RTK GPS positioning system. This positioning system will be used to place the cap material as required to meet the minimum cap thickness of 8 inches. The cap material will consist of a ~30% (v/v) Aquagate and ~70% (v/v) sand mixture. This mixture will be prepared by adding one bucket of aquagate to two buckets of sand and then blending the materials to obtain a well-blended mixture.

Once the repairs to the active cap layer have been completed, a core sample will be taken to confirm the thickness of the Sand/AquaGate cap within panel N39. Additional core samples will also be taken in panels N38 and N37 to confirm that the minimum cap thickness requirements are achieved. If the cores show that the cap thickness is less than the minimum 8 inches, additional cap material will be added to those areas and the re-sampled to confirm that the required cap thickness has been achieved.

Placement of Geotextile and Armor Stone

The root cause of the panel N39 instability has not been definitively determined. The operating assumption is that the geotextile was inadequately anchored to at the shore, and subsequent placement of rock further down the slope caused the panel to pull away from the shoreline.

Based on this assumption, GLDD developed the following placement method which will be implemented to minimize the potential for a reoccurrence.

The geotextile and armor stone will be placed using the capping barge, positioned with the currently approved anchoring system. The barge will be reconfigured so that the capping barge is orientated perpendicular to the shore and the Poseidon Barge fleets along the side of the capping barge. The newly constructed shroud/chute will be used to deploy the geotextile fabric in the current.

To anchor the geotextile on shore, the geotextile fabric will be extended up onto the existing rip rap layer along the shore and additional armor stone will be placed on top of the geotextile to hold it in place. Once the geotextile panel is anchored the panel will be lightly armored from the shore to the leading edge of the geotextile panel. Once the geotextile panel is fully extended, the final thickness of armor stone will be added by placing the stone from the base and working back up the slope towards shore. This placement method is intended to provide a stable base for the remaining armor stone to prevent it from rolling down the slope.

Overlap at Panels N36 and N37

After panel N39 slid down the slope, panel placement at N37 and N38 were postponed. Panel placement resumed at N36 and armor stone was placed on the upstream edge of panel N36 to secure its positioning. Due to the proposed repairs, the 18 inch overlap between panel N36 and N37 is not possible. The following procedure will be used for the overlap between panels N36 and N37.

When placing panel N37, the overlap of geotextile fabric from panel N37 onto panel N36 will be a minimum of 18 inches. Armor stone will be placed in panel N37 on top of the fabric along the edge of existing stone on panel N36. The placement of stone along the edge of the panels will be monitored to insure that the maximum average armor thickness is not exceeded. Once completed, CH2M HILL will evaluate the placement and determine whether the flap of fabric that extends atop the stone on panel N36 will have to be cut or can be left in place.

Interim Survey Results at Panels N37, N38, and N39

Lastly, there was some question regarding the 140401 Rock Thickness Survey provided by GLDD as to why these northern steep-slope areas have, in some instances, elevations that are above earlier surveys even though these areas have had the armor stone and geotextile materials removed. The interim survey that GLDD provided to show progress showed higher elevations in panels N37, N38 and N39 than the post-Sand/AquaGate layer placement surveys. This was the result of an incomplete survey, which resulted in reporting higher elevations in those areas. The interim survey was entirely water based and did not include any land based survey data. This combined with a single beam survey line over a rip rap slope, which most likely was not in the same track as the original survey, resulted in the higher average elevations. Since that interim survey, GLDD has performed additional surveys of the area resulting in more consistent results with the original survey elevations. These surveys are currently being reviewed and will be submitted the week of March 14th.

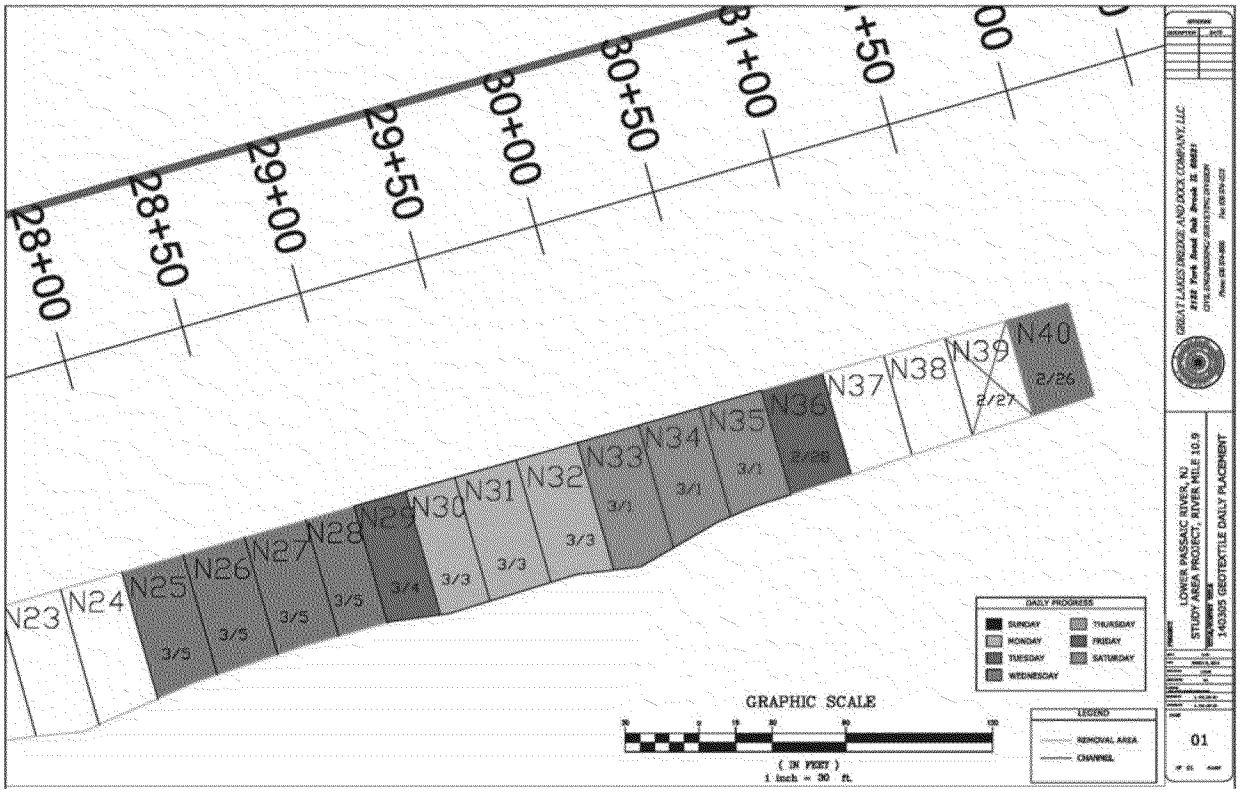

Figure 1